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Supplement Article

# Toward the economic evaluation of participatory approaches in health promotion: lessons from four German physical activity promotion projects

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## Abstract

Health promotion increasingly employs participatory approaches, but the question arises whether the likely higher costs of participation also translate into greater benefits. This article takes a first step toward a full health economic evaluation by comprehensively reporting the costs of a specific participatory approach, Cooperative Planning, in a German research consortium to promote physical activity. We conducted a costing analysis of Cooperative Planning at 22 sites across six settings. Project teams used a custom template to record resource use. We calculated average costs per meeting, site and setting using the opportunity costs approach, and obtained feedback from participating researchers. A total of 144 planning meetings with an average of nine participants were conducted. Costs per meeting varied significantly across settings. Differences were mostly attributable to varying meeting duration, preparation time and numbers of participants. Across settings, human resources accounted for roughly 95% of the costs. Implementing researchers reported challenges regarding the logic and methods of the health economic analysis. A participatory approach to physical activity promotion may cause substantially varying costs in different settings despite similar cost structures. However, their value for money could turn out comparably favorable if (and only if) the expected benefits is indeed forthcoming. Despite some challenges implementing the costing exercise into the logistics of ongoing participatory projects, this analysis may pave the way toward a full health economic evaluation, and the template may be useful to future participatory health promotion projects.

**Key words:** health economics, costing, physical activity, cooperative planning, participatory approaches

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## INTRODUCTION

Insufficient physical activity (PA) is a key risk factor for chronic diseases, including cardiovascular disease, certain types of cancer and type 2 diabetes. Although the health benefits of PA are well-documented, globally, 28% of adults and 80% of adolescents are inactive (Guthold *et al.*, 2018). In Germany, 23% of adults and 26% of children and adolescents fall short of meeting recommended PA levels (Finger *et al.*, 2017, 2018). The high prevalence of physical inactivity places a significant burden on health care services and the wider economy. A recent global estimate put the health care costs attributable to physical inactivity at $54 billion worldwide in 2013 (Ding *et al.*, 2016).

Increasing PA levels would bring major population health gains, but changing behavior is difficult. As there is reason to believe that public health interventions using a top-down approach have limited effects (Finegood *et al.*, 2014), there have been calls for more effective solutions to attain positive behavior change. This has led to the development of more "open" intervention designs using innovative participatory and collaborative approaches, in which researchers co-produce knowledge and develop measures in close collaboration with stakeholders and members of the addressed population group (Rütten *et al.*, 2009; Zwass, 2010; Rütten and Gelius, 2014).

As it is at least conceivable that participatory approaches involve the use of significant resources, which could also be used in other ways that may be more useful in producing health (or other societally desirable outcomes), it is important to further investigate their value for money. However, participatory interventions tend to be complex, intersectoral and context-specific, with outputs and outcomes often varying depending on the setting, addressed population group and individual implementation site. This poses challenges for the evaluation of both their effectiveness and cost-effectiveness. Prior attempts in this direction have been limited so far, both in health promotion in general (Crocker *et al.*, 2017; Gilmer *et al.*, 2018; Forchuk *et al.*, 2019) and in the field of PA in particular (Wolfenstetter *et al.*, 2012).

This paper aims to contribute to the health economic analysis of participatory projects by focusing on its first step, that is, the assessment of the resource use and costs. This is an often-neglected area in many health economic evaluations (Wolfenstetter, 2011). Naturally, a mere cost comparison allows no judgment of the relative value of one intervention versus another, nor of the approach as a whole compared to, say, more standardized PA interventions. A full analysis would also require assessing their (health and/or other) benefits, which may reveal that potential extra intervention costs are in fact outweighed by additional benefits. However, a systematic and comparable costing form the basis of any fully-fledged health economic evaluation, and it will become clear that this step already poses important challenges for participatory multi-setting interventions.

We applied the costing approach to four projects of a German research consortium for PA promotion that used a specific set of participatory interventions in different health promotion settings (Rütten *et al.*, 2017; Gelius *et al.*, 2020). The paper starts by outlining the interventions and the methods used for recording resources, which may also serve as an illustrative guide and potential format for future projects with a similar design. The results section provides information about the planning processes and their costs, with a focus on illustrating the cost "pattern" for the approach in the different settings rather than on specific costs of each individual step in the process. In addition, it presents feedback obtained from the researchers conducting the interventions on our costing procedure and outcomes. The discussion addresses implications of the results for the general appeal of participatory interventions, the challenges encountered during the implementation of the costing approach, and the question of how to reconcile the different perspectives of public health and health economics in the context of participatory interventions.

## METHODS

### The cooperative planning process

This article reports results from Capital4Health (C4H), a research consortium funded from 2015 to 2018 (Phase 1) and 2018 to 2021 (Phase 2) by the German Federal Ministry of Education and Research as part of an effort to strengthen national research on prevention. Based on the ideas of Nobel laureate in Economics, Amartya Sen, C4H promotes capabilities (Sen, 1993; Abel and Frohlich, 2012) for PA across the life-course by using tailored participatory interventions. The central methodological foundation for developing capabilities is transdisciplinary research (Bergmann *et al.*, 2012), which has been discussed in public health under various monikers over the last decade (Rütten *et al.*, 2017; Frahsa *et al.*, 2020). On this basis, C4H aims at increasing the interaction between (i) researchers, (ii) policymakers, (iii) health promotion practitioners and (iv) members of the addressed population group, using the "Cooperative Planning" approach (Rütten, 1997; Rütten and Gelius,

2014). In each setting, a planning group consisting of representatives from all four above-mentioned domains convenes for a series of meetings to brainstorm and prioritize ideas, develop specific measures, agree on an action plan and monitor its implementation. Project researchers typically act in a dual capacity as organizers/moderators of the process and as scientific PA experts. Typical outputs may be media campaigns, group-specific programs, infrastructure development or changed access rules for PA-specific facilities.

This article reports results from four sub-projects of C4H which implemented a Cooperative Planning approach in different settings across the life-course (for a more detailed overview, see Rütten *et al.*, 2017; http://www.capital4health.de/en):

- A4M (Action for Men) intervened in two rural communities in Eastern Bavaria to improve PA opportunities for men over 50 years of age (community setting).
- Health.edu (Health-related education) aimed at increasing the sport-related health competence of children in secondary schools (school setting) and the teaching competence of future physical education (PE) teachers in universities (university setting; Ptack, 2019).
- PArC-AVE (PA-related Health Competence in Apprenticeship and Vocational Education) addressed PA promotion in vocational education in a large car manufacturing company (car mechatronics setting) and a nursing school (nursing care setting; Popp *et al.*, 2020).
- QueB (Qualität entwickeln mit und durch Bewegung/Developing Quality with and through PA) aimed in childcare centers in two northern Bavarian regions (Müller *et al.*, 2019). The intervention differed from the other projects by including counseling and evaluation sessions for individual centers.

## Evaluation

For the present study, we recorded resource use and estimated the costs of Cooperative Planning interventions conducted in Phase 1 (2015–2018) of the four C4H projects using a multi-stage approach, which included: (i) development of a template for resource consumption, (ii) recording resource consumption by each project's staff, (iii) monetary valuation of resource use and cost calculation, (iv) feedback from projects and (v) final data analysis.

*Step 1*: We started by developing a costing template (Supplementary File S1) to ensure comparable documentation of resource consumption for all Cooperative Planning processes. The template was created in consultation with the four project teams and included (i) basic information on all Cooperative Planning meetings, (ii) human resource use/costs in terms of time invested in the Cooperative Planning process by participating scientists, policymakers/practitioners, representatives of the addressed population group and (iii) material costs (e.g. for subsistence, consumables, travel).

*Step 2*: Project teams used the template to compile the relevant information for the entire implementation period of the Cooperative Planning interventions from November 2015 to February 2018. For each project, researchers documented the number of intervention settings, sites and Cooperative Planning processes conducted. For each process, they listed the number of sessions and participating scientists, policymakers/practitioners and population group representatives. Human resource costs were recorded in "natural units", that is, the estimated hours invested for meeting preparation, realization and debriefing. This was done by reviewing researchers' own schedules, recording meeting durations, and obtaining feedback from project partners. Depending on their own time and staff resources available, project teams either recorded data in real time (i.e. directly when they were incurred) or at the end of the respective planning process.

*Step 3*: After the end of the interventions, the central evaluation team reviewed all templates and, in collaboration with project teams, estimated missing data based on the time invested by other, comparable partners. We then determined the specific intervention costs for each setting and implementation site. We only considered costs related exclusively to the implementation of the Cooperative Planning processes, thus ensuring that calculations would reflect only those costs that would likely be incurred again if the process were to be replicated by others interested in conducting a similar intervention. This meant that costs arising from the initial development of the intervention, project administration and scientific evaluation were not considered eligible.

While project teams had provided material costs directly in Euros, human resource costs had to be calculated individually for all Cooperative Planning participants. Taking a societal perspective of what the relevant costs would be, and following standard economic evaluation practice (see e.g. Drummond *et al.*, 2015), we interpreted costs in terms of "opportunity costs", that is, the benefits that a person gives up by choosing one particular option (opportunity), which prevents them from choosing the next best alternative option (Salamon *et al.*, 2011; Kasteng *et al.*, 2016). For

example, a practice partner taking part in a Cooperative Planning meeting cannot perform their usual professional tasks at the same time. Their human resource costs are hence calculated by multiplying their respective hourly wage (based on their usual salary) by the hours spent preparing, attending, and post-processing the Cooperative Planning meetings.

For the calculation, we obtained each individual's job position from our project partners and sought to determine their income category. For researchers, we used the salary classification for public service members in the State of Bavaria (Öffentlicher-Dienst.info, 2017; LfF, 2017; FAU, 2017). Similar income tables were also available for other types of participants, for example, city mayors in communities (Bayerische Staatskanzlei, 2012) and for teachers and principals at Bavarian secondary schools (Beamtenbesoldung-Besoldung, 2021). Even with this information, exact incomes may vary based on characteristics we were not able to obtain, such as age, job tenure, and family status. We therefore calculated three separate estimates for all human resource costs based on the minimum, average and maximum salaries of each income bracket. For some participants, specific job positions and/or income categories could not be determined. We estimated their hourly wages based on the average gross income for full/part-time positions in the State of Bavaria in 2016 (excluding marginal employment, Statistisches Bundesamt, 2017).

*Steps 4 and 5*: Based on the costs per meeting, we calculated the total costs of the Cooperative Planning intervention for each site and setting. We compiled results tables and structured reports of our calculation steps for each project and asked project researchers to verify our calculations. In addition, project teams were sent a short feedback questionnaire ($n = 4$, one per project team; see Supplementary File S2) which gave them the opportunity to comment on various aspects of the costing analysis, including (i) general comprehensibility of the costing method, (ii) validity of the calculations, (iii) their interpretation of the results and (iv) utility of the approach from a health promotion perspective and suggestions for the future. Based on their feedback, results tables were reviewed and finalized.

## RESULTS

Tables 1–4 present an overview of the estimated costs for the four projects with all their settings and implementation sites. To improve readability, only results based on our estimates for *average* (avg.) human costs are presented here. Minimum and maximum human costs are available as Supplementary File S3 to this article.

### Projects, settings, sites, sessions and participants

Table 1 shows the basic structure of the four projects and their Cooperative Planning processes. Overall, the intervention was conducted in six different settings. The two variants of the QueB intervention in the childcare setting (with and without evaluation) are also reported separately. There were 22 intervention sites in total, but the number of sites per setting varied substantially (from one per PArC-AVE setting, to seven in Region A of QueB). A total of 144 Cooperative Planning meetings were conducted. On average, there were seven meetings per setting, ranging from four in the two PArC-AVE settings to 9.5 in the community setting of A4M. Sessions in QueB included the additional meetings for individual counseling (Region A and B) and evaluation (Region B only). Each meeting had an average of nine participants (2 scientists, 5 policy and 2 representatives of the population group), again with considerable variation between settings. Due to the specificities of some settings, there were no population group representatives in several Cooperative Planning processes: In A4M, many policymakers/practitioners were themselves men over 50 and therefore had dual roles; the university setting in Health.edu specifically targeted PE lecturers, teachers and students, while schoolchildren were part of the project's other setting; the children in QueB were considered too young to participate in the planning process.

Table 2 shows the average human resource and material costs per meeting for the different sites and settings. In general, the costs for an individual scientist were higher than those for an individual policymaker/practitioner. Figures for the latter group varied substantially between settings, reflecting the diverse professions represented in the different Cooperative Planning processes (from public office holders, university lecturers and high school teachers to company representatives and preschool teachers). Costs for participating members of the addressed population groups were relatively low.

Material costs only accounted for a small proportion of the overall meeting costs; in general, they depended on the size of the meeting, that is, sessions with fewer participants tended to incur lower costs. Travel costs for participants were a major factor of influence for this budget item. There were also context-specific differences between different sites (e.g. the different schools and universities in Health.edu).

**Table 1:** Overview of C4H projects' structure, number of meetings and participants per session

| Project | Setting | Site | No. of sessions | Average number of attendants per session | | | |
|---|---|---|---|---|---|---|---|
| | | | | Scientists | Policymakers/ Practitioners | Population group representatives | Total |
| *A4M* | Community | Community A | 10 | 3 | 10 | — | 13 |
| | | Community B | 9 | 3 | 8 | — | 11 |
| *Health.edu* | University | University A | 8 | 4 | 10 | — | 14 |
| | | University B | 9 | 3 | 8 | — | 11 |
| | School | School A | 6 | 3 | 3 | 3 | 9 |
| | | School B | 6 | 3 | 3 | 2 | 8 |
| | | School C | 5 | 3 | 3 | 1 | 7 |
| | | School D | 6 | 3 | 3 | 2 | 8 |
| *PArC-AVE* | Car mechatronics | Car Company | 4 | 5 | 6 | 1 | 12 |
| | Nursing care | Nursing School | 4 | 5 | 9 | 6 | 20 |
| *QueB* | Childcare center Region A | Center A1 | 6 | 1 | 5 | — | 6 |
| | | Center A2 | 6 | 1 | 7 | — | 8 |
| | | Center A3 | 6 | 2 | 3 | — | 5 |
| | | Center A4 | 6 | 1 | 7 | — | 8 |
| | | Center A5 | 6 | 1 | 3 | — | 4 |
| | | Center A6 | 6 | 1 | 3 | — | 4 |
| | | Center A7 | 6 | 1 | 4 | — | 5 |
| | Childcare center (plus evaluation) Region B | Center B1 | 7 | 2 | 5 | — | 7 |
| | | Center B2 | 7 | 1 | 5 | — | 6 |
| | | Center B3 | 8 | 1 | 12 | — | 13 |
| | | Center B4 | 7 | 1 | 5 | — | 6 |
| | | Center B5 | 6 | 1 | 7 | — | 8 |

*Note*: Figures are rounded off; numbers may therefore sometimes not seem to fully add up.

The average total costs for a Cooperative Planning meeting ranged from 405 € in Region A of the QueB childcare setting (intervention variant without evaluation) to 1612 € in the PArC-AVE nursing school setting. These were also the settings with the lowest and highest number of participants per meeting, respectively. There were also notable differences within settings, with QueB's Region A (span from 261 to 689 €) and the Health.edu university setting (817–1622 €) being the most heterogeneous in terms of costs. By comparison, the A4M community setting (946–974 €), the Health.edu school setting (427–519 €) and QueB's Region B (660–1109 €) were more homogeneous.

## Overall costs of the cooperative planning process

The overall costs of an entire Cooperative Planning process per site and setting are summarized in Table 3. The highest costs were incurred in the university setting of Health.edu, where an average planning process cost 10 163 € per site. The lowest costs were calculated for the QueB Region A with average costs of 2431 € per planning process. Again, the differences between individual sites within settings varied: While ranges of total costs were comparatively small in the A4M community setting (8511–9735 €), there were more pronounced differences between sites in the Health.edu university setting (7351–12 974 €) and QueB Region B (4551–8870 €).

As shown in Table 4, the costs for researchers accounted for 20–63% of the total costs per planning session, whereas those for policymakers/professionals ranged from 31% to 78%. Costs for population group representatives never exceeded 9% of the total. Across projects and sites, costs for human resources accounted for 88–98% of the total costs. The maximum costs for

**Table 2:** Categories of average costs, costs per meeting by site, setting

| Project | Setting | Site | Human resource costs | | | | | | | | | Material costs (€) | Average total costs per meeting | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Costs per scientist[a] (€) | ×No. of Scientists | =Total costs for Scientists (€) | Costs per policymaker/ practitioner (€)[a] | ×No. of policymakers/ practitioners | =Total costs for policymakers/ practitioners (€) | Costs per Population group representatives (€)[a] | ×No. of Population group representatives | =Total costs for Population group representatives (€) | | per site (€) | per setting (€) |
| A4M | Community | Community A | 117 | 3 | 350 | 51 | 10 | 507 | — | — | — | 116 | 974 | 960 |
| | | Community B | 144 | 3 | 431 | 50 | 8 | 398 | — | — | — | 117 | 946 | |
| Health.edu | University | University A | 172 | 4 | 646 | 91 | 10 | 908 | — | — | — | 67 | 1622 | 1219 |
| | | University B | 123 | 3 | 370 | 53 | 8 | 420 | — | — | — | 26 | 817 | |
| | School | School A | 89 | 3 | 267 | 61 | 3 | 182 | 0 | 3 | 0 | 13 | 463 | 474 |
| | | School B | 89 | 3 | 267 | 49 | 3 | 147 | 0 | 2 | 0 | 13 | 427 | |
| | | School C | 100 | 3 | 299 | 50 | 3 | 150 | 0 | 1 | 0 | 40 | 488 | |
| | | School D | 102 | 3 | 307 | 57 | 3 | 171 | 0 | 2 | 0 | 40 | 519 | |
| PArC-AVE | Private Company | Car company | 103 | 5 | 516 | 81 | 6 | 489 | 36 | 1 | 36 | 50 | 1091 | 1091 |
| | Nursing School | Nursing center | 133 | 5 | 664 | 84 | 9 | 756 | 24 | 6 | 143 | 50 | 1612 | 1612 |
| QueB | Childcare center Region A | Center A1 | 117 | 1 | 117 | 52 | 5 | 260 | — | — | — | 20 | 397 | 405 |
| | | Center A2 | 142 | 1 | 142 | 76 | 7 | 533 | — | — | — | 14 | 689 | |
| | | Center A3 | 72 | 2 | 143 | 55 | 3 | 166 | — | — | — | 13 | 323 | |
| | | Center A4 | 120 | 1 | 120 | 42 | 7 | 297 | — | — | — | 13 | 431 | |
| | | Center A5 | 103 | 1 | 103 | 48 | 3 | 144 | — | — | — | 13 | 261 | |
| | | Center A6 | 112 | 1 | 112 | 72 | 3 | 217 | — | — | — | 14 | 343 | |
| | | Center A7 | 121 | 1 | 121 | 64 | 4 | 257 | — | — | — | 15 | 393 | |
| | Childcare center (plus evaluation) Region B | Center B1 | 122 | 2 | 245 | 86 | 5 | 432 | — | — | — | 24 | 701 | 783 |
| | | Center B2 | 257 | 1 | 257 | 81 | 5 | 405 | — | — | — | 24 | 685 | |
| | | Center B3 | 221 | 1 | 221 | 72 | 12 | 861 | — | — | — | 27 | 1109 | |
| | | Center B4 | 245 | 1 | 245 | 78 | 5 | 388 | — | — | — | 26 | 660 | |
| | | Center B5 | 204 | 1 | 204 | 76 | 7 | 532 | — | — | — | 23 | 758 | |

*Note*: Only figures based on *average* estimates for salaries are shown here. For figures based on *minimum and maximum* estimates, please refer to Supplementary File S3. Figures are rounded off; total costs may therefore sometimes not seem to be fully accurate.

[a]Average costs per scientist, per policymaker/practitioner, and per population group representative were calculated individually for each site, accounting for (a) the average hourly rate of a scientist, policymaker/practitioner and population group representative at the site and (b) the average time spent preparing, attending and post-processing a Cooperative Planning session at the site.

**Table 3:** Average total costs per site and setting

| Project | Setting | Site | Average total costs per meeting (€) | *x* No. of sessions | =Average total costs | |
|---|---|---|---|---|---|---|
| | | | | | Per site (€) | Per setting (€) |
| A4M | Community | Community A | 974 | 10 | 9735 | 9123 |
| | | Community B | 946 | 9 | 8511 | |
| Health.edu | University | University A | 1622 | 8 | 12 974 | 10 163 |
| | | University B | 817 | 9 | 7351 | |
| | School | School A | 463 | 6 | 2775 | |
| | | School B | 427 | 6 | 2561 | 2722 |
| | | School C | 488 | 5 | 2440 | |
| | | School D | 519 | 6 | 3111 | |
| PArC-AVE | Private Company | Car Company | 1091 | 4 | 4362 | 4362 |
| | Nursing School | Nursing center | 1612 | 4 | 6449 | 6449 |
| QueB | Childcare center Region A | Center A1 | 397 | 6 | 2381 | |
| | | Center A2 | 689 | 6 | 4133 | |
| | | Center A3 | 323 | 6 | 1938 | |
| | | Center A4 | 431 | 6 | 2584 | 2431 |
| | | Center A5 | 261 | 6 | 1564 | |
| | | Center A6 | 343 | 6 | 2059 | |
| | | Center A7 | 393 | 6 | 2358 | |
| | Childcare center (plus evaluation) Region B | Center B1 | 701 | 7 | 4906 | |
| | | Center B2 | 685 | 7 | 4798 | |
| | | Center B3 | 1109 | 8 | 8870 | 5549 |
| | | Center B4 | 660 | 7 | 4619 | |
| | | Center B5 | 758 | 6 | 4551 | |

*Note*: Only figures based on *average* estimates for salaries are shown here. For figures based on *minimum and maximum* estimates, please refer to Supplementary File S3. Figures are rounded off; total costs may therefore sometimes not seem to be fully accurate.

consumables (1%), subsistence (4%) and travel (11%) were relatively low, with total material costs never exceeding 13% at any of the investigated sites.

### Feedback from research partners

The responses by the four project teams provided via the feedback questionnaires yielded some very valuable additional insights regarding data collection, potential improvements for future cost analyses and the relation of the intervention costs to preliminary project outcomes. Results indicated that, as PA and health promotion experts, our colleagues did not always find it easy to understand the health-economic logic and methods employed for the costing analysis. Also, they found the documentation of costs to be time-consuming and difficult to perform on top of their other project duties. This resulted in project teams recording part of the costs not in real time but retrospectively after the end of the respective Cooperative Planning processes, which in turn led to the need to estimate certain costs (e.g. when the exact amount of time spent for preparing a particular meeting could no longer be ascertained).

The project teams also pointed out that researchers working at different sites may have systematically overestimated or underestimated costs depending on their interpretation of concepts such as "meeting preparation time" or their understanding of the difference between activities related to the project intervention and the accompanying research. Teams also provided valuable suggestions for future improvements, including (i) more precise costing of factors such as meeting preparation time, (ii) including the costs incurred by partners (e.g. financial support from other sources), (iii) more resources to allow for better recording of costs during the intervention, and (iv) clearer instructions on how to isolate the Cooperative Planning process from other aspects of the project.

## DISCUSSION

This study has assessed the costs of the Cooperative Planning approach across a broad variety of sites and settings. To the best of our knowledge, this is the first attempt to collect cost data on this particular approach at

**Table 4:** Shares of average costs in percent per site and meeting

| Project | Setting | Site | Average total costs per meeting (€) | Human resource costs | | | | | | | | Material costs | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Total costs for scientists | | Total costs for policymakers/practitioners | | Total costs for pop. group reps. | | Total human resource costs | | Total traveling costs | | Total subsistence costs | | Total consumable costs | | Total material costs | |
| | | | | € | % | € | % | € | % | € | % | € | % | € | % | € | % | € | % |
| A4M | Community | Community A | 974.00 | 350 | 36 | 507 | 52 | — | — | 857 | 88 | 100 | 10 | 15 | 2 | 1 | 0 | 116 | 12 |
| | | Community B | 946.00 | 431 | 46 | 398 | 42 | — | — | 829 | 88 | 100 | 11 | 16 | 2 | 1 | 0 | 117 | 13 |
| Health.edu | University | University A | 1622.00 | 646 | 40 | 908 | 56 | — | — | 1554 | 96 | 0 | 0 | 67 | 4 | 0 | 0 | 67 | 4 |
| | | University B | 817.00 | 370 | 45 | 420 | 51 | — | — | 790 | 96 | 0 | 0 | 21 | 3 | 5 | 1 | 26 | 4 |
| | School | School A | 463.00 | 267 | 58 | 182 | 39 | 0 | 0 | 449 | 97 | 4 | 1 | 8 | 2 | 2 | 0 | 14 | 3 |
| | | School B | 427.00 | 267 | 63 | 147 | 34 | 0 | 0 | 414 | 97 | 4 | 1 | 8 | 2 | 2 | 0 | 14 | 3 |
| | | School C | 488.00 | 299 | 61 | 150 | 31 | 0 | 0 | 449 | 92 | 30 | 6 | 8 | 2 | 2 | 0 | 40 | 8 |
| | | School D | 519.00 | 307 | 59 | 171 | 33 | 0 | 0 | 478 | 92 | 30 | 6 | 8 | 2 | 2 | 0 | 40 | 8 |
| PArC-AVE | Private Company | Car company | 1091.00 | 516 | 47 | 489 | 45 | 36 | 3 | 1041 | 95 | 50 | 5 | 0 | 0 | 0 | 0 | 50 | 5 |
| | Nursing School | Nursing center | 1612.00 | 664 | 41 | 756 | 47 | 143 | 9 | 1563 | 97 | 50 | 3 | 0 | 0 | 0 | 0 | 50 | 3 |
| QueB | Childcare center Region A | Center A1 | 397.00 | 117 | 29 | 260 | 65 | — | — | 377 | 94 | 10 | 3 | 8 | 2 | 2 | 1 | 20 | 6 |
| | | Center A2 | 689.00 | 142 | 21 | 533 | 77 | — | — | 675 | 98 | 4 | 1 | 8 | 1 | 2 | 0 | 14 | 2 |
| | | Center A3 | 323.00 | 143 | 44 | 166 | 51 | — | — | 309 | 95 | 3 | 1 | 8 | 2 | 2 | 1 | 13 | 4 |
| | | Center A4 | 431.00 | 120 | 28 | 297 | 69 | — | — | 417 | 97 | 3 | 1 | 8 | 2 | 2 | 0 | 13 | 3 |
| | | Center A5 | 261.00 | 103 | 39 | 144 | 55 | — | — | 247 | 94 | 3 | 1 | 8 | 3 | 2 | 1 | 13 | 5 |
| | | Center A6 | 343.00 | 112 | 33 | 217 | 63 | — | — | 329 | 96 | 4 | 1 | 8 | 2 | 2 | 1 | 14 | 4 |
| | | Center A7 | 393.00 | 121 | 31 | 257 | 65 | — | — | 378 | 96 | 4 | 1 | 8 | 2 | 2 | 1 | 14 | 4 |
| | Childcare center (plus evaluation) Region B | Center B1 | 701.00 | 245 | 35 | 432 | 62 | — | — | 677 | 97 | 7 | 1 | 7 | 1 | 10 | 1 | 24 | 3 |
| | | Center B2 | 685.00 | 257 | 38 | 405 | 59 | — | — | 662 | 97 | 6 | 1 | 12 | 2 | 6 | 1 | 24 | 4 |
| | | Center B3 | 1109.00 | 221 | 20 | 861 | 78 | — | — | 1082 | 98 | 8 | 1 | 9 | 1 | 9 | 1 | 26 | 3 |
| | | Center B4 | 660.00 | 245 | 37 | 388 | 59 | — | — | 633 | 96 | 10 | 2 | 11 | 2 | 6 | 1 | 27 | 5 |
| | | Center B5 | 758.00 | 204 | 27 | 532 | 70 | — | — | 736 | 97 | 8 | 1 | 8 | 1 | 7 | 1 | 23 | 3 |

such a large scale. The template developed for documenting the costs of the Cooperative Planning process turned out to be a useful tool that could be administered in a decentralized fashion by researchers from the individual projects. However, despite attempts to make the questionnaire as clear as possible, many involved health promotion researchers who were unfamiliar with the concept and practice of economic evaluation needed central support. In addition, the fact that part of the costs was not recorded in real time due to lack of team resources meant that some data had to be estimated either by the project teams themselves or the central evaluation team. Consequently, this issue has to be considered when interpreting the data. We were unable to obtain further details on the exact amount of time it took projects to record costs, which would have allowed for a better judgment of how feasible future costing exercises may be. However, the available feedback still leads us to conclude that future projects would require more resources to improve real-time data collection and thus data quality.

In addition, it was difficult to always precisely disentangle the time invested in the Cooperative Planning process from other project tasks (e.g. regarding the working hours of student assistants taking meeting minutes, which could be used both for scientific evaluation and for the planning process itself). In an attempt to address this issue, the evaluation team compared the information obtained from all projects, settings and sites, and subsequently approached project teams regarding potential inconsistencies. In some cases (e.g. A4M), this led to the re-classification of specific project activities. In others, however, it turned out that different settings/sites (e.g. Region A and B of QueB) did indeed require different organizational arrangements in the Cooperative Planning process (e.g. longer working hours). Still, this procedure left room for interpretation and may have contributed to varying results between settings but also between sub-teams within projects and will need to be addressed for future costing analyses, for example, by further clarifying and simplifying the template.

Another challenge is whether to use wage rates as proxy measures for the opportunity costs in participatory health promotion projects, as is generally recommended in standard health economic guidelines (see e.g. Institute for Quality and Efficiency in Health Care [IQWiG], 2017). As far as the C4H settings and actors are concerned, it may be important to acknowledge attendees' intended purpose for participating in a meeting to decide when to use wage rates as a measure of opportunity costs. Only calculating participants' wages during the time spent in planning groups may not capture the full range of costs, as missed working hours may also directly translate into missed profits (e.g. in the case of private company managers and staff). Even more frequently, however, the exact opposite may be true, i.e. many Cooperative Planning participants *volunteer* to take part (often in their leisure time), thus creating both methodological and ethical issues for the health-economic evaluation (Sendi and Brouwer, 2004). A potential alternative that has been discussed is the "replacement cost" approach for volunteer work, which estimates costs not based on the volunteers' regular income but based on what it would cost to hire someone on the free market to perform the task (Salamon *et al.*, 2011; Kasteng *et al.*, 2016). However, this is not really compatible with our intervention, as Cooperative Planning relies on the participation of individuals with particular societal functions rather than on the performance of particular tasks—it would, for instance, not be sensible to hire someone to do the mayor's work in the Cooperative Planning process. In addition, many participants (e.g. public office holders) were not "classic" volunteers in a health-economic sense (Handy and Srinivasan, 2004), and population group members might even be likened to "patients" (Sendi and Brouwer, 2004). Against this backdrop, it may be most useful to propose a range of measurement tools for reporting opportunity costs to properly reflect the narrower perspective of the provider of the intervention. Presenting the costs from different perspectives (i.e. societal as well as provider) would allow potential users of the evidence to choose the one they consider the most relevant for themselves.

Despite these challenges, our analysis provides several results that are relevant to both health economic and health promotion experts. Our analysis indicates that, depending on the setting, the costs of involving a group of relevant stakeholders in the development of specific measures for PA promotion range from roughly 2500 € (QueB Region A) to 10 000 € (Health.edu university setting). Across all sites and settings, the main source of costs for the Cooperative Planning process is human resources, while material costs only play a marginal role. Given the participatory nature of the approach, this result was to be expected, as well as a certain degree of variation between sites and settings. However, the extreme cost differences found e.g. between the nursing school setting in PArC-AVE and the university setting in Health.edu warrant further discussion. A closer look reveals that meetings were larger (more participants), more numerous, and took longer in some sites and settings than in others. We see two main

reasons for this: First, some individual sites or entire settings may have been "weaker" in terms of existing organizational capacities and participants' individual capabilities for PA promotion, thus requiring a more comprehensive and resource-intensive approach than in other places. Second, settings may be unique regarding their culture (e.g. regarding the number of people involved in decision-making processes or the way meetings are conducted) and their acceptance for participatory approaches or the involvement of external academic expertise. In addition to this, we also observed substantial variation between settings regarding the costs for individual policymakers/practitioners. From our perspective, projects did not substantially differ regarding the functions of the involved individuals from this group (e.g. heads of institutions, experts for PA, representatives of relevant implementation practitioners), but these "typical" individuals had very different qualification levels and, consequently, opportunity costs. Again, it is important to avoid a normative judgment on these cost variations. While on the one hand, holding meetings that involve more people will see costs increase linearly with the number of participants, those larger meetings may at the same time allow to address a larger population group, hence reducing the costs per population group member. Any normative judgment will ultimately depend on the extra benefits (marginal utility) gained from holding meetings with more participants. To the extent that marginal benefits decrease with the number of participants (as one might expect), while costs increase linearly, there will be an optimum (i.e. utility-maximizing) level of participants that is below the maximum possible size of the meetings.

Relating our results to other costing exercises of participatory approaches is not easy. To the best of our knowledge, there is only one study that has measured the costs of the specific Cooperative Planning approach used in the four C4H projects. Wolfenstetter *et al.* (2012) analyzed the costs of the BIG ("Bewegung als Investition in Gesundheit" *[PA as an Investment for Health]*) project to promote PA among women in difficult life situations in a medium-sized German city. The project conducted Cooperative Planning processes in three different settings (sport club, company and residential district). Results show that the costs for an average planning meeting amounted to 1139 € for the company setting and to 1704 € for the residential setting. One might compare this to the respective settings in PArC-AVE (1091 €) and A4M (960 € per meeting), but concrete conclusions are difficult due to differences in the methodology and the fact that BIG project data were collected between 2005 and 2007 (To increase comparability with the more recent cost figures from the present project, it is possible to update the costs calculated by Wolfenstetter *et al.* (Wolfenstetter *et al.*, 2012) to 2018-levels. This yields costs of 1362 € and 2037 €, respectively. Calculations are based on the CCEMG—EPPI-Centre Cost Converter, see https://eppi.ioe.ac.uk/costconversion/.).

When comparing the costs of the C4H intervention to other intervention types in health promotion, it is important to note that we only recorded the costs of the participatory component, that is, the costs for program development. Relating these results to other PA interventions, for example, "traditionally-structured" PA programs, infrastructural measures, or motivational campaigns would also require including the costs for the specific measures that emanated from the Cooperative Planning processes, such as flyers produced in A4M communities or a set of PA lessons developed for the nursing school in PArC-AVE. Conversely, it seems that interventions which are not developed collaboratively between researchers and community practitioners often seem to focus on implementation rather than development costs (see e.g. Sutherland *et al.*, 2016; Kesztyüs *et al.*, 2017; Oosterhoff *et al.*, 2018). This poses additional challenges for comparing them to our approach, and further research is needed to shed light on this issue. As non-participatory projects might also require a certain number of project meetings with external partners, the incremental costs of adding a Cooperative Planning process to a conventional intervention might turn out to be relatively low.

A potential way of increasing the comparability of the results might be to relate the costs of the Cooperative Planning process to the number of individuals from the addressed population group reached in each setting. Conceptually, this is rather problematic, as estimating population group sizes across settings in a comparable fashion is difficult. In addition, to obtain a complete picture, one would also need to consider the specific measures developed by Cooperative Planning groups and their long-term effects, which was not possible in the present study. For example, a Cooperative Planning process in a childcare center might lead to the construction of new outdoor facilities, which in turn would affect not only the children enrolled in the facility during the lifetime of the project but also the children joining the facility in subsequent years. Nonetheless, we conducted some preliminary calculations for costs per population group member, but presenting and discussing these would have been beyond the scope of this article. However, they are available as Supplementary File S4 to this article.

Another potentially relevant point this study has not been able to address is that participatory approaches may not only incur but also save costs during or after project implementation. For example, Gibbs *et al.* (2008) identified a number of potential cost savings of community-based participatory research, such as lower costs of intervention participant recruitment. Most savings, however, are of a more long-term nature, for example, in terms of reduced healthcare costs, increased sustainability and a reduced need for the repeated funding of interventions. Similarly, Lachance *et al.* (2020) find that the costs of community-based participatory research tend to arise in the early stages of the process, while the benefits only appear later. Full-fledged cost-effectiveness studies building on a costing exercise like the one presented in this article would need to consider these potentially relevant, more comprehensive economic aspects of participatory research.

On a more general note, it is important to recognize the different logics of conventional (medical-based) and participatory health promotion: For the former, interventions are developed (potentially with the involvement of stakeholders and patients) and pilot-tested once, after which they are ready for implementation in multiple settings using the same blueprint. The latter, by contrast, assumes that contexts are so specific that a new development process is needed for every single one before implementation. As the resulting measures will necessarily vary between settings, so will the achieved effects. In real-world health promotion, there is a continuum between "pure" medical-based and fully participatory projects, but these different logics still pose some fundamental challenges for health economic evaluation and comparison.

Finally, this study sheds some light on the challenges that lie ahead when trying to reconcile the different logics of health economics and health promotion. In a recent review of the use of economic evidence to inform disease prevention policy, Liu *et al.* found that capacity in the health sector to understand economic evidence on interventions is limited and that capacity-building is needed to promote the use of this evidence (Liu *et al.*, 2017). The feedback from our partners mirrors these findings, indicating that health promotion research experts may find the logic and methods employed by health economics hard to understand. They also found it difficult to see a direct benefit of a health economic analysis for their work, especially given their limited amount of resources and the additional workload connected to cost documentation. More resources would have been required to support real-time collection of cost-related data, thus reducing the need for retrospective data estimates and improving the data quality. Future projects should provide additional resources that allow researchers to record costs thoroughly and improve the implementation of health economic costing exercises in participatory research. This is important, as participatory approaches are widely regarded as increasing the sustainability of health promotion (Green *et al.*, 1996; Nutley *et al.*, 2007; Brownson *et al.*, 2009), but their costs need to be transparent and their comparative cost-effectiveness needs to be shown to secure continued or future support from relevant funding bodies, and to avoid foregoing health (or other) benefits that could be reaped from alternative uses of the limited resources. The experience of C4H suggests that the health promotion researchers and experts who run interventions were crucial for the success of the health economic evaluation: They acted as liaisons to Cooperative Planning process actors, provided crucial background information and supported data cleaning and interpretation. A purely "external" evaluation would be unlikely to yield results of a similar quality. It may therefore be crucial for future studies to enlist health promotion experts' support by fostering their understanding of the health economic logic and convincing them of the benefits of such an exercise.

## CONCLUSIONS

This article has provided a first comprehensive overview of the costs of a specific participatory approach for developing programs across various sites and settings, thus contributing to a better understanding of this important step of assessing the value for money of such approaches.

It is clear that the cost analysis conducted for this study is only a first step toward a full-fledged health economic evaluation of the Cooperative Planning approach. In order to achieve this, it would be necessary not only to record the intervention costs but also their benefits across settings in a comparable fashion. The participatory processes in C4H may lead to benefits on a broad variety of dimensions. Preliminary evaluation results from the consortium indicate that the Cooperative Planning processes led to the development and implementation of a broad range of specific measures to promote physical activity, including infrastructure changes in childcare centers, new lessons and curriculum changes in schools, workshops and tutoring systems in the company setting, and the creation of new sport offers in communities (Gelius *et al.*, 2020). Project outcomes include, for example, increased organizational capacity in PArC-AVE project (Popp *et al.*, 2020) and A4M (Loss

*et al.*, 2020; Strobl *et al.*, 2020a), improved skills of nursing school teachers in the QueB project (Müller *et al.*, 2019), significantly improved PA-related health literacy and sport-related health competencies of high school students in Health.edu (Ptack, 2019; Strobl *et al.*, 2020b), and a significantly higher average number of steps per hour among both children and staff in child-care centers of QueB (Müller *et al.*, 2019). Of course, in light of the non-randomized research design, it has to be noted that these effects may not be solely attributed to the participatory approaches used but that the contribution of the developed measures as such also has to be considered when assessing the effectiveness and cost-efficiency of the projects.

In light of these benefits, however, the value for money of these interventions may still turn out comparably favorable despite the additional costs caused by the participatory component. However, as these different outcomes render a comparative analysis of cost-effectiveness challenging, a future full health economic evaluation of these projects may have to explore innovative approaches to measure outcomes in a unified way, for example, using measures of capabilities for physical activity (Sen, 1993; Abel and Frohlich, 2012, Sauter *et al.*, 2018; Coast, 2019). Beyond these immediate challenges lie many more, for example, in the costing of alternative approaches, the calculation of incremental costs, and the measurement and valuation of benefits arising from health promotion interventions.

Finally, our study showed that there are still issues regarding the implementation of a health economic analysis in participatory research projects, and that connecting the perspectives of health economics and health promotion remains a challenging but also crucial task. A further refinement of tools, more cooperation between the disciplines and capacity building is required to achieve a common understanding of the subject. The template developed for this study may serve as a useful starting point but also requires further refinement, for example, designing and testing a revision of the existing version. In this context, it will be especially important to provide health promotion researchers with adequate resources to document the costs of their participatory projects more accurately and in real time, allowing them to demonstrate the potential cost-effectiveness of their approaches.

## SUPPLEMENTARY MATERIAL

Supplementary material is available at *Health Promotion International* online.

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## ETHICS STATEMENT

The present study conducted by the CAP COM project received ethical clearance from the Ethics Committee of the Friedrich-Alexander Universität Erlangen-Nürnberg [Application Nr. 390_18 B].

## CONFLICT OF INTEREST STATEMENT

The authors, P. Gelius, R. Sommer, K. Abu-Omar, V. Schätzlein and M. Suhrcke declare that they have no competing interests.

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